REMARKS

This application has been carefully reviewed in light of the Office Action dated July 16, 2004. Claims 1 to 45 are in the application, of which Claims 1, 25, 44 and 45 are the independent claims. Claims 1 and 25 have been amended herein merely to correct a typographical error. Reconsideration and further examination are respectfully requested.

Initially, the Examiner's indication that Claims 2, 3 and 26 contain allowable subject matter is acknowledged with appreciation.

In the Office Action, Claims 1, 4 to 25 and 27 to 45 were rejected under 35 U.S.C. § 102(b) over U.S. Patent No. 6,002,916 (Lynch). Reconsideration and withdrawal of the foregoing rejection are respectfully requested.

The present invention generally relates to spacecraft communication between a first spacecraft in a first orbit, and a second spacecraft in a second orbit. Spatial information is transmitted and received between the first spacecraft and the second spacecraft, the spatial information being indicative of at least the first spacecraft position and orientation, and the second spacecraft position and orientation. An information packet is received, the information packet including at least routing information, where the routing information includes at least a destination spacecraft as a destination of the information packet. A desired route is determined from a plurality of routes to transmit the information packet to the destination spacecraft, each of the plurality of routes including a plurality of path spacecrafts. The information packet is transmitted based upon the desired route and the spatial information of the plurality of path spacecrafts of the desired route.

Turning to specific claim language, independent Claim 1 describes a spacecraft network, the network including a first server spacecraft disposed in a first server orbit, a first client

spacecraft disposed in a first client orbit, and a wireless local area network formed between at least the first server spacecraft and the first client spacecraft. The wireless local area network includes at least one communication channel to transmit and receive spatial information between at least the first server spacecraft and the first client spacecraft, the spatial information indicative of at least a first server position and a first server orientation of the first server spacecraft and a first client position and a first client orientation of the first client spacecraft. The wireless local area network also includes at least one receiver to receive a first communication signal including at least routing information, the routing information including at least a destination spacecraft as a destination of the first communication signal. The wireless local area network further includes at least one routing system to determine a desired route from a plurality of routes to transmit the first communication signal to the destination spacecraft, each of the plurality of routes corresponding to a plurality of path spacecrafts. Moreover, the wireless local area network includes at least one transmitter to transmit the first communication signal based upon the desired route and the spatial information of the plurality of path spacecrafts of the desired route. The first client spacecraft is free from the at least one routing system, and the first server spacecraft includes one of the at least one routing system.

Independent claim 25 describes a spacecraft network, the network including a first server spacecraft disposed in a first server orbit, a second server spacecraft disposed in a second server orbit, and a wireless wide area network formed between at least the first server spacecraft and the second server spacecraft. The wireless wide area network includes at least one communication channel to transmit and receive spatial information between at least the first server spacecraft and the second server spacecraft, the spatial information indicative of at least a first server position and a first server orientation of the first server spacecraft and a second server position and a

second server orientation of the second server spacecraft. The wireless wide area network also includes at least one receiver to receive a first communication signal including at least routing information at the first server spacecraft, the routing information including at least a destination spacecraft as a destination of the first communication signal. The wireless wide area network further includes at least one routing system to determine a desired route from a plurality of routes to transmit the first communication signal from the first server spacecraft to the destination spacecraft, each of the plurality of routes corresponding to a plurality of path spacecrafts. Moreover, the wireless wide area network includes at least one transmitter to transmit the first communication signal based upon the desired route and the spatial information of the plurality of path spacecrafts of the desired route. The first server spacecraft includes one of the at least one routing system.

Independent claim 44 describes a method for spacecraft communication, the method including the steps of disposing a first server spacecraft in a first server orbit, disposing a first client spacecraft in a first client orbit, and transmitting and receiving spatial information between the first server spacecraft and the first client spacecraft, the spatial information indicative of at least a first server position and a first server orientation of the first server spacecraft and a first client position and a first client orientation of the first client spacecraft. The method also includes the step of receiving an information packet including at least routing information, the routing information including at least a destination spacecraft as a destination of the information packet. The method further includes the step of determining a desired route from a plurality of routes to transmit the information packet data to the destination spacecraft based on at least the spatial information of the destination spacecraft, the plurality of routes corresponding to a plurality of paths respectively, each of the plurality of paths including a plurality of path

spacecrafts. Moreover, the method includes the step of transmitting the information packet based upon the desired route and the spatial information of the plurality of path spacecrafts of the desired route. The first client spacecraft is free from the at least one routing system, and the first server spacecraft includes one of the at least one routing system.

Independent claim 45 describes a method for spacecraft communication, the method including the steps of disposing a first server spacecraft in a first server orbit, disposing a second server spacecraft in a second server orbit, and transmitting and receiving spatial information between the first server spacecraft and the second server spacecraft, the spatial information indicative of at least a first server position and a first server orientation of the first server spacecraft and a second server position and a second server orientation of the second server spacecraft. The method also includes the step of receiving an information packet including at least routing information, the routing information including at least a destination spacecraft as a destination of the information packet. The method further includes the step of determining a desired route from a plurality of routes to transmit the information packet data to the destination spacecraft based on at least the spatial information of the destination spacecraft, the plurality of routes corresponding to a plurality of paths respectively, each of the plurality of paths including a plurality of path spacecrafts. Moreover, the method includes the step of transmitting the information packet based upon the desired route and the spatial information of the plurality of path spacecrafts of the desired route. The first server spacecraft includes one of the at least one routing system.

The applied art is not seen to teach or suggest the features of the present invention. In particular, Lynch is not seen to disclose at least the features of the transmission of spatial information and communication information between spacecraft, the spatial information

indicative of at least a position and orientation of the spacecraft, and the communication information including routing information, where the communication information is transmitted based upon the spatial information of a plurality of spacecraft. Support for these features is found throughout the disclosure, including pages 22 to 25 of the specification, and Figures 9 to 11.

By transmitting spatial information and communication information, the present invention allows spacecraft to be placed in close proximity to each other, creating a local formation or cluster and increasing the variety of payloads available to mission planners. Spatial coordination, and particularly the exchange of spatial information, gains increased importance as spacecraft are located closer to each other.

Lynch is generally directed to a space-based server network architecture which permits on-demand transfers of mission and control data between client satellites in an Earth orbit. *See* Lynch, Abstract; and col. 5, ll. 18 to 31. Each server satellite includes a communication crosslink for providing intercommunication with client satellites within its field of view. *See* Lynch, Abstract; and col. 2, ll. 26 to 34.

The Office Action alleges that Lynch discloses one communication channel to transmit and receive spatial information between at least the first server spacecraft and the first client spacecraft, the spatial information indicative of at least a first server position and a first server orientation of the first server spacecraft and a first client position and a first client orientation of the first client spacecraft, and at least one receiver to receive a first communication signal including at least routing information, the routing information including at least a destination spacecraft as a destination of the first communication signal. The Office Action further alleges that Lynch discloses at least one transmitter to transmit the first communication signal based

upon the desired route and the spatial information of the plurality of path spacecrafts of the desired route. As to both allegations, Applicants respectfully disagree.

The portion of Lynch cited by the Office Action is generally seen to describe the disposition of server satellites in appropriate orbits to provide world-wide communications, and the establishment of an "inter-satellite communications link" which provides secure, non-interceptable transmission and reception of data between server satellites. *See* Lynch, col. 2, ll. 16 to 46. While it is true that Lynch does describe a single server-client intercommunication link, nowhere is Lynch seen to describe a transmission of spatial information, such as information indicative of a position and orientation of a spacecraft, in addition to communication information. Furthermore, even assuming *arguendo* that spatial information could be transmitted, contrary to the assertions in the Office Action, Lynch is not seen to transmit communication information based upon the spatial information of a plurality of spacecraft. *See* Lynch, col. 2, ll. 35 to 46.

As such, since the transmission or reception of spatial information is not described by Lynch, Applicants assert that the applied art is also not seen to teach or disclose at least the features of the present invention. In particular, the applied art is not seen to teach or disclose the transmission of spatial information and communication information between spacecraft, where the spatial information is indicative of at least a position and orientation of the spacecraft, where the communication information includes routing information, and where the communication information is transmitted based upon the spatial information of a plurality of spacecraft.

Accordingly, based on the foregoing amendments and remarks, independent Claims 1, 25, 44 and 45 are believed to be allowable. The other claims in the application are each dependent from the independent claims mentioned above and are believed to be allowable for at

least the same reasons. Because each dependent claim is deemed to define additional aspects of the invention, however, the individual consideration of each on its own merits is respectfully requested.

In view of the foregoing amendments and remarks, the entire application is believed to be in condition for allowance and such action is respectfully requested at the Examiner's earliest convenience.

Finally, as to a formal matter, Applicants respectfully request that the Examiner return an initialed copy of the Form PTO-1449 that was submitted with the Information Disclosure Statement dated February 27, 2004, thereby indicating that the Examiner has considered the art cited therein.

Applicants' undersigned attorney may be reached in our Orange County office by telephone at (949)851-0633. All correspondence should continue to be directed to our address given below.

Respectfully submitted,

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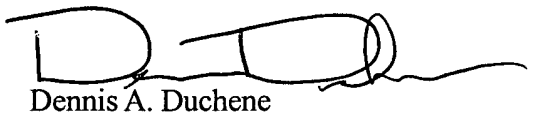

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